



REVIEW GROUP -  
RADIOACTIVE DEVICES

UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

December 7, 1995

Anthony LaMastra, CHP  
Health Physics Associates, Inc.  
1005 Old Route 22  
Lenhartsville, PA 19534

Dear Mr. <sup>Tony</sup> LaMastra:

Thank you for arranging a site visit to the Steelton, PA plant of Bethlehem Steel. The date for the visit will be Thursday, December 21, 1995. If weather prevents travel, then we will have to cancel the visit since we do not have any alternate dates.

There will be 8 persons traveling to the plant as follows:

By van:

Joint Agreement State-NRC Working Group

Robert Free, Texas  
Robin Haden, North Carolina  
Rita Aldrich, New York  
Joel Lubenau, NRC  
Lloyd Bolling, NRC

Other NRC

Chris Ryder, who is conducting a risk assessment study of the problem of radioactive material in metal scrap and Steve Baggett whose branch reviews applications for devices that contain radioactive material.

Other State - traveling separately:

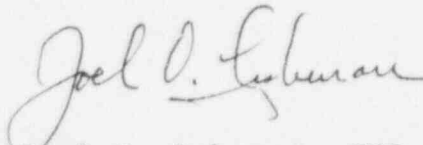
Jim Yusko, Pennsylvania, who is the CRCPD liaison to the Working Group.

We plan to visit a scrap processing facility in Hagerstown, Maryland on the morning of December 21, 1995 and then travel to Steelton. I estimate an arrival time in Steelton of 1 pm. I plan to call ahead to advise you and the plant of any changes in the itinerary. Our travelers have been advised to wear appropriate outerwear and safety shoes, boots or sturdy shoes. I'm assuming that any required safety equipment, e.g., hardhats, will be available at the plant. If this is not the case, please let me know.

Although I am aware of the location of the Steelton plant, it would be helpful to have directions to the plant entrance that we should use and a list of contacts at the plant and their telephone and fax numbers.

Given the charge by the Commission to the Working Group - to review the regulatory program for devices containing radioactive materials (which can become mixed with recycled metal scrap) - the visit to the Steelton plant should be both educational and timely. Again, and this time on behalf of the Working Group and NRC staff, please accept my thanks for arranging this visit.

Sincerely,

A handwritten signature in cursive script, reading "Joel O. Lubenau".

Joel O. Lubenau, CHP  
Senior Health Physicist  
Working group Co-chair

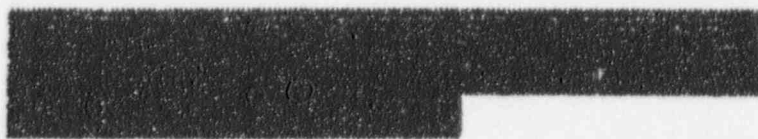
cc: R. Free, Co-chair



State of Oregon  
Health Division  
Radiation Protection Services  
(503)731-4014  
FAX: (503)731-4081

**FAX**

REVIEW GROUP -  
RADIOACTIVE DEVICES



DATE: 10/23/95  
TO: JOEL LUBENAU  
FROM: MARTHA DIBBLEE

PAGES (including this cover page): 11

Message: Examples of how we have  
managed GLs.

My WORKING (T.F.) Priority

1. Any Cs 137, Co-60, Sr 90 or Am 241

Source > ImCi register for license.

2. Lease directly to possessor.

3. Ensure that mfg/agency can act  
for LOCATION OF DEVICE/source

301 415 5369

INFORMATION BULLETIN FOR SCRAP METAL DEALERS, STEEL MILLS,  
SMELTERS AND OTHER METAL PROCESSORS

1. Review the potential for radioactive materials to be found in scrap material. Cost of clean up.
2. Types of radioactive material
  - Industrial sealed sources
  - NORM (foundry materials, fertiliser, rock, sand, pipe scale, etc)
  - Exempt sources
  - Consumer Products (especially those containing radium)
  - Contaminated steel in transport vehicle
3. Notifications - RCS, ODOE, PUC, OERS

Note: PUC was at one time looking into installing monitors, similar to those at OR Steel, at the ports of entry.

4. Options
  - Reject and return undisturbed (emphasize this is best and cheapest option) using DOT Exemption authorized through CRCPD
  - Remove material and process usable material; dispose of RAM properly
  - n.o.s. license required if radioactive material is to be onsite more than 7 days.
5. Recommended and/or Statutory Procedures
  - Set up RAM Monitoring system with licensed HP consultant assistance (NaI Scintillation detectors with proper size/configuration and proper orientation)
  - Contract with licensed HP consultant for at least annual recalibration and appropriate adjustment of alarm levels of detection system
  - Verify proper functioning of detector system at least monthly (or as recommended by manufacturer) with appropriate activity check source
  - Upon detection of source material and alarm system activation, take the following actions:
    - a. Report Incident to Duty Officer
    - b. Contact licensed HP consultant to assist in returning shipment to originating facility (Requires use of DOT exemption for shipping per 49 CFR requirements, available from RML Duty Officer)
    - c. If facility and HP consultant agree to remove material from shipment, receiving facility becomes responsible "possessor" of radioactive material and only the following options exist in statute:
      - 1) Arrange to ship RAM for disposal with assistance of licensed HP consultant within seven (7) days or
      - 2) Make application for RML license to possess radioactive materials within seven (7) days.

**Oregon****DEPARTMENT OF  
HUMAN  
RESOURCES****HEALTH DIVISION****ENFORCEMENT BULLETIN 95-3**

**To: All General Licensees**

**From: Martha Dibble, Manager**  
**Radioactive Materials Program**

Please complete the enclosed Inspection by Mail form and FAX or mail to this office by June 30, 1995. Should you have any questions, please do not hesitate to contact me.

MGD:clh

1:\red\rob\letters\letter\_and\7/3/95-10-11

*This gets sent  
once a year  
during annual  
registration*

John A. Kitzhaber  
Governor



800 NE Oregon Street # 21  
Portland, OR 97232-2162  
(503) 731-4030 Emergency  
(503) 252-7978 TDD  
Emergency

24-26 (Rev. 12-94)

OREGON HEALTH DIVISION  
RADIATION PROTECTION SERVICES  
800 N.E. OREGON, #21, SUITE 705  
PORTLAND, OREGON 97232

PHONE (503) 731-4014  
FAX (503) 731-4081

ENFORCEMENT BULLETIN 95-3

INSPECTION BY MAIL

GENERAL LICENSE MEASURING DEVICE, DEPLETED URANIUM, OR IN VITRO LAB

Instructions: Please type or print. Mail or FAX the completed form to this office by June 30, 1998.

1. Licensee Name \_\_\_\_\_
2. Address \_\_\_\_\_
3. City, State, Zip \_\_\_\_\_
4. Phone Number (     ) \_\_\_\_\_ 5. FAX Number (     ) \_\_\_\_\_
6. License Number \_\_\_\_\_
7. License type: ☐ Fixed Gauge  
☐ ECD (XRF or Gas Chromatograph Detector)  
☐ In Vitro Lab  
☐ Depleted Uranium  
☐ Source Material

8. List persons who use general license devices or materials:

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9. Describe how general license radioactive materials are used.

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10. Describe the radiation safety training that personnel have had.

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11. Corporate structure

Attach a current organizational chart. Describe any changes in the scope of your business including corporate take-overs or other significant corporate changes.

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## GENERAL LICENSE INSPECTION BY MAIL -- PAGE 3

## 12. Administrative Requirements

Do you have a copy of the General License Rules? ☐ yes ☐ no

Are all general license materials properly labelled? ☐ yes ☐ no

Did any general license device require leak testing? ☐ yes ☐ no

Were leak tests performed as required? ☐ yes ☐ no  
 Attach copies of leak test records with this form.

Were radiation surveys required for any devices? ☐ yes ☐ no  
 Attach copies of surveys with this form.

Were any general license materials transferred to another person? ☐ yes ☐ no  
 Attach copies of all transfers with this form.

## 13. Inventory

Complete the following chart showing all radioactive materials possessed and used. Attach extra pages if required. Key Device number to Safety Inspection Form on next page

<u>Manufacturer</u>	<u>Model no.</u>	<u>Isotopes &amp; Activity</u>	<u>Location</u>

## 14. Certificate

- (a) I certify that the information provided on this form is true and complete to the best of my knowledge and belief.
- (b) I have read and understand the provisions of the general license in OAR 333-102-130 (in vitro labs), 333-102-115 (measuring, gauging, or controlling devices), or 333-102-103 (depleted uranium), and I understand that I am required to comply with these provisions as to all radioactive material that I possess and use in Oregon under the general license.

Signature \_\_\_\_\_ Title \_\_\_\_\_

Print name \_\_\_\_\_ Date \_\_\_\_\_

\*\*\*\*\*

COMMENTS OR QUESTIONS

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## GENERAL LICENSE DEVICE SAFETY INSPECTION FORM

Instructions: List all devices below. Provide the information for each device in columns labeled 1, 2, 3, and 4. Use another form for more devices.

DEVICES				CRITERIA
1	2	3	4	
				Record locations and device ID numbers
				Record device model numbers
				Is Radioactive Material ID label present on at least 1 side (should be both sides if both sides visible) of head containing source? (yes or no)
				Is information legible on ID labels?
				If ID labels are not present or legible, certify (initial/yes) that repairs will be completed and provide estimated repair date.
				Record source serial numbers.
				Record isotopes & quantity (e.g. Cs-137, 100 uCi)
				Are devices operable? (yes means operable; no means not installed or not operable)
				Test "ON-OFF" mechanism manually. Do shutters move between open/on and closed/OFF position smoothly?
				Are GREEN radiation lamps ON & RED lamps OFF when shutters or sources are in closed/OFF position?
				Are RED radiation lamps ON & GREEN lamps OFF when shutters or sources are in open/ON position?
				Do all interlocks/safety features operate according to manufacturer's specifications?
				Record sealed source "leak test" interval (e.g. 6 months, 3 years)
				Record last "leak test" date
				Record last "leak test" result in microcuries

COMMENTS or QUESTIONS:

## CERTIFICATE

I/we certify that the information above is accurate and true to my/our knowledge and belief.

Licensee: \_\_\_\_\_

License No. \_\_\_\_\_

Signed \_\_\_\_\_

Date \_\_\_\_\_

Print name \_\_\_\_\_

Title \_\_\_\_\_



(503) 731-4014  
FAX (503) 731-4081  
Nonvoice (503) 732-4031

# Oregon

DEPARTMENT OF  
HUMAN  
RESOURCES

September 20, 1994

HEALTH DIVISION



TO: Oregon Radioactive Materials Licensees

FROM: Martha Dibblee, Manager  
Radioactive Materials Program

RE: Radioactive Materials Inventory

## ENFORCEMENT BULLETIN 94-6

Radioactive materials licensees must account for all radioactive material received, transferred, and disposed under administrative rules in OAR 333-100-055. Please review the attached form, which is a list of radioactive materials that are authorized on your radioactive materials license. Please enter the total number of sources and the total amount of radioactive material in the blanks provided.

Please mail or FAX (503 731 4081) the completed form as soon as possible, but no later than October 15, 1994. Responses received after this date cannot not be included in our current database update.

Should you have any questions, please do not hesitate to contact this office.

\\VAD\BOS\BEN\ENF94-6.094\*12/9/94-9:19

Barbara Roberts  
Governor



800 NE Oregon Street # 21  
Portland, OR 97232-2162  
(503) 731-4030 Emergency  
(503) 252-7978 TDD  
Emergency  
24-26 (Rev. 1-92)

Page No. 12

09/20/94

ENTER THE  
TOTAL NO.  
SOURCESENTER THE  
TOTAL  
AMOUNT IN  
MILLICURIES

\*\* FACILITY NAME: Sulzer Bingham Pumps, Inc.

\* LICENSE NUMBER ONE-0027-1

~~05-60~~ Sealed Source  
~~05-60~~ Sealed Source  
~~RA-226~~ Sealed Source  
~~25-192~~ Sealed Source  
~~Co-137~~ Sealed Source  
~~Fe-55~~ Sealed Source  
~~05-109~~ Sealed Source

1	61,000 mci
1	3,000 mci
5	1,911 mci
1	20,000 mci
1	12.5 mci
1	2.5 mci
1	5 mci

✓ 9-27-94 *ph*

ACTUAL  
 Example of  
 response

RECEIVED

SEP 27 1994

RADIATION CONTROL SECTION

# Oregon

(503) 229-8797

FAX (503) 229-8994

Invoice (503) 229-6741

November 13, 1991

DEPARTMENT OF  
HUMAN  
RESOURCES

HEALTH DIVISION

## ENFORCEMENT BULLETIN 91-1

## Results

TO: All general licensees who possess nuclear fixed gauging devices

FROM: Martha Dibblee, Manager, Radioactive Materials Licensing

SUBJECT: Inspection by Mail for General Licensees possessing nuclear gauges

The Oregon Health Division Radiation Control Section regulates nuclear fixed gauging devices in Oregon.

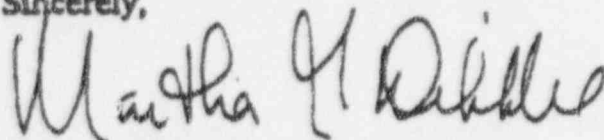
Our records show that you possess a generally licensed nuclear gauge. Please complete the following form, following instructions on the cover sheet.

The Inspection by Mail Form must be completed and returned to this office by December 31, 1991.

Thank you for your attention to this bulletin.

Should you have questions, you may contact this office at 503/229-5797.

Sincerely,



Martha G. Dibblee, Manager  
Radioactive Materials Licensing  
Radiation Control Section

MGD:clh  
Enclosure

Barbara Roberts  
Governor



1400 SW 5th Avenue  
Portland, OR 97201  
(503) 229-5599 Emergenc  
(503) 252-7978 TDD  
Emergency

sp by mail

Proceeding

11077

1-16

11-13-92

Tea Silina

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Trinity College  
179-1

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Onion Chunks

T.C. Walther

St. Lawrence

[illegible]

SP by mail

NAME	2 Resp Person	3 Use	4 Mfg Service Procedures	5 Regulatory Responsibility	6 Explained Responsibilities	Inventory	How often	Accounting Procedure	7 Test	8 LEAK TEST	9 RAM	10 INST	Calib	11 xchg	12 inventory	13 form prepared by	14 Date prepared	15 COMMENTS
Conradis	OK	OK	OK	OK	?	?	?	?	N/A	OK	?	?	?	?	OK	OK	OK	N/A
Verfiker	OK	OK	OK	OK	OK	OK	OK	?	N/A	OK	OK	N/A	N/A	NO	OK	OK	OK	
ry of Sofon	OK	OK	OK	OK	?	OK	OK	OK	N/A	OK	OK	N/A	N/A	NO	OK	OK	OK	
neel	OK	OK	OK	OK	OK	OK	OK	OK	N/A	OK	OK	N/A	N/A	OK	OK	OK	OK	N/A



**STATEMENT OF THE  
STEEL MANUFACTURERS ASSOCIATION**

**ON  
LOST RADIOACTIVE SOURCES IN THE  
FERROUS SCRAP SUPPLY**

**U.S. NUCLEAR REGULATORY COMMISSION-STATE WORKING GROUP  
PUBLIC MEETING**

**OCTOBER 24 - 26, 1995**

The Steel Manufacturers Association ("SMA") consists of 56 North American companies that operate 123 steel plants and employ approximately 63,000 people. Our U.S. member companies are represented in the U.S. Congress by 93 Congressional Districts located in 38 states.

The member companies of the SMA are widely dispersed geographically, with 45 located in the United States, eight in Canada, and three in Mexico. The SMA also has 121 Associate Member companies, located worldwide, that supply goods and services to the steel industry.

Most of the SMA companies operate electric arc furnaces ("EAF") to make raw steel from a feedstock of almost 100% ferrous scrap. Some SMA members are reconstituted integrated (ore-based, using a 10-20% scrap feedstock) companies, producing steel from iron ore and other raw materials.

SMA members account for approximately 40% of U.S. steel production and are the largest recyclers in the country. EAFs consumed approximately 42 million net tons of scrap metal in 1994 (source: U.S. Bureau of Mines), including the steel scrap derived from 9 million junked automobiles and from tin cans, old appliances, and other discards in our society.

**GROWTH FORECAST**

Mini-mills, carbon specialty steel mills, and reconstituted integrated mills represent a competitive and dynamic segment of the North American steel industry. They are rapidly capturing an increasing share of U.S. markets. The output of EAF steel producers will reach nearly 50% of U.S. steel production in ten years.

*Attachment 2*



## LOST RADIOACTIVE SOURCES: ECONOMIC CONSEQUENCES AND RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

Scrap metal purchased as a feedstock by EAF steelmakers increasingly contains shielded radioactive sources, such as cesium-137 or cobalt-60. Typically, these are radioactive heads from gauges used in manufacturing operations that have shut down, or those contained in discarded hospital equipment, or in retired equipment resulting from U.S. military downsizing. These radioactive sources are generally shielded in lead containers, which can pass through even the most sensitive radiation detection devices.

Twenty-four accidental radioactive material smeltings have occurred in the United States since 1981 and hundreds more have been discovered before they were melted. (See Attachment)

The increase in contaminated scrap is directly proportional to: (1) the number of radioactive devices licensed by the Nuclear Regulatory Commission ("NRC") over the last few decades; and (2) the NRC's failure to adequately track and control the safe disposition of these sources. According to 1993 NRC data, there were more than 550,000 radioactive sources in the United States, including: (a) 22,000 specific licensees; (b) 2,300 gauge licensees; (c) 31,600 general licensees; (d) 456,000 10 C.F.R. § 31.5 devices; and (e) 42,000 gauges. (*Radioactive Material in Metal Scrap*, Joel O. Lubenau, Nuclear Regulatory Commission)

The exact number of radioactive devices in the scrap metal supply is unknown. The NRC estimates that 15 sources are lost in the United States each year, but SMA member company experiences show that far more untraced or lost sources exist in the North American scrap supply. One major scrap broker discovered more than 300 radioactive sources mixed with scrap metal between 1990 and 1993. Moreover, the NRC concluded that: (1) total yearly reports of contaminated scrap metal has skyrocketed since 1988; and (2) the actual number of reported discoveries of radioactive sources in scrap metal represent only the "tip of the iceberg." *Lubenau* at 13. mc  
NRC

**The absence of adequate regulations governing the issuance of licenses, and the sales, transfers, and disposal of licensed devices is painfully apparent.**

Under the current regulatory framework, there is an ***economic disincentive*** for individual scrap dealers to identify lost radioactive sources before they are shipped in scrap to steel companies. Due to the high costs for proper disposal of a radioactive source the current regulatory system creates an incentive for the finder of a lost source to conceal rather than identify a radioactive source. As a result, sources are often sent to scrap processors or to EAF facilities.

## STEEL COMPANY PREVENTATIVE MEASURES

SMA companies with melt shops operate sophisticated radiation detection systems to monitor incoming scrap at their truck and rail entry stations. They have implemented handling systems and safety procedures in the event a source is discovered. As most licensed sources are contained in lead containers that shield the radioactivity, not even the most advanced detection systems can detect all the radioactive sources entering a plant. Technology alone is insufficient to solve the problem. Any solution must combine the efforts of the regulating agencies, the steel industry, and the scrap industry.

## POTENTIAL HEALTH EFFECTS

Despite their use of the best equipment to detect shielded sources, EAF companies have become the innocent victims of the lost source problem. Most of the 24 accidental smeltings of radioactive material have involved scrap metal containing cesium-137 sources, an Atomic Energy Act material. When a cesium-137 source is melted, it contaminates equipment (including the EAF, baghouse, and duct systems), baghouse dust, and the surrounding facility. Radioactive melts can pose potentially serious threats to workers, the surrounding community, and the environment. **Only by sheer luck have there been no injuries or fatalities as a result of inadvertently melting of a radioactive source.**

In one instance in Florida, a teletherapy unit was discovered prior to melting that was rated for 5,000 curies of cobalt-60. Had the unit contained its rated quantity of cobalt-60 and been melted, it would have subjected melt shop workers to a lethal dose of radiation, and the radiation would have spread for more than a mile.

## ECONOMIC EFFECTS

There are devastating economic consequences if a radioactive source is melted in an EAF. The resulting downtime and cleanup costs have a major negative economic impact on steel companies.

Available data from five SMA companies indicate that the costs associated with decontaminating a facility after a radioactive melt range between \$2 million and \$4 million. The costs of disposing and storing radioactive EAF dust range between \$3 million and \$15 million. Due to the time a facility must cease steel production, the melting of a radioactive source can cost \$5 million to \$13 million in lost revenues. Thus, the total costs associated with melting a radioactive source typically exceed \$10 million per melt and can be as high as \$24 million per melt. In contrast, a licensee that illegally disposes of a radioactive source faces a fine equivalent to a speeding ticket, assuming the source can be traced back to the licensee, which cannot be done if a source is melted.

## REGULATORY JURISDICTION

Contaminated EAF dust poses a problem that falls under both the Environmental Protection Agency ("EPA") and the NRC jurisdiction. EAF dust is already an EPA listed hazardous waste ("K061") that is regulated under the Resource Conservation and Recovery Act ("RCRA"). When EAF dust is contaminated, it is also considered a low-level mixed hazardous waste, and this falls under both EPA and NRC jurisdiction.

A regulatory gap exists for the disposition of radioactive contaminated EAF dust. Under current EPA and NRC regulations, radioactive EAF dust: (1) cannot be processed at a typical High Temperature Metals Recovery ("HTMR") recycling facility, which is the preferred method most commonly used for recycling EAF dust; and (2) cannot be stabilized and disposed of in a lined RCRA hazardous waste landfill.

not  
+ ueh  
BCE  
Source  
dust

Consequently, six U.S. steel producers are temporarily storing on-site approximately 25,000 tons of low-level radioactive EAF dust for which there is no cost efficient recycling, treatment, or disposal option. These facilities are unfairly exposed to potential citizen suits or enforcement actions because they typically are forced into the untenable position of having to store a RCRA hazardous waste (K061) on-site without being able to obtain the necessary RCRA storage permits. Until an appropriate regulatory solution is developed so that facilities can economically recycle, treat, and/or dispose of EAF dust with low levels of radioactivity, a growing number of U.S. steel producers will accumulate and have to store low-level radioactive K061 on-site, despite the fact they are operating state-of-the-art detectors. This makes no economic or environmental sense.

## PRE-MELT RECOMMENDATIONS

This problem must be addressed now. Regulatory solutions to the radioactive scrap metal problem must be divided into two separate areas: (1) preventive "pre-melt" recommendations designed to prevent radioactive sources from entering the scrap stream and to remove radioactive sources currently in the scrap stream; and (2) "post-melt" solutions designed to assist EAF facilities that accidentally melt a radioactive source to decontaminate their facilities and dispose of contaminated EAF dust.

The NRC, EPA, Department of Energy ("DOE"), the Institute of Scrap Recycling Industries ("ISRI"), and the steel industry should initiate joint efforts to assure more effective control of radioactive sources. The EPA and NRC need to develop a coordinated and flexible approach to regulate low level mixed waste and establish a scientifically supported risk-based threshold for regulating a waste as "radioactive."

SMA has urged the NRC to impose licensing fees which could be rebated when proof is obtained that licensees have properly disposed of licensed radioactive sources. Moreover, the NRC should implement an incentive program under which scrap processors would have financial incentives rather than incur financial penalties for identifying sources in the scrap stream.

The high cost of disposal creates an incentive for those who discover contaminated scrap metal to avoid notifying the appropriate authorities and to pass the contaminated scrap down the scrap stream. A scrap dealer who identifies radioactive material inherits the costs of appropriate disposal, unless the material can somehow be traced back to the licensee. EAF steel producers and their workers will continue to be the victims of radioactive melts, until, the NRC implements a program that encourages dealers and processors to remove radioactive sources from the scrap stream.

## POST-MELT SOLUTIONS

Currently, EAF dust containing more than 2 pCi/g of cesium-137 cannot be recycled in a conventional high temperature metals recovery ("HTMR") facility. However, there is concurrence among health physicists who have studied the issue that EAF dust with less than 50 pCi/g of cesium-137 can be safely recycled. It should not be subject to more stringent regulations than those applicable to wastewaters containing similar levels of cesium-137 which is allowed to be discharged from a NRC-licensed facility to a totally "unrestricted area."

A risk assessment report prepared for the SMA, including a comprehensive health assessment, supports an exemption under which EAF dust containing up to 100 pCi/g of cesium-137 could be stabilized to meet stringent leachate standards and landfilled in a hazardous waste landfill that meets all applicable requirements under RCRA (*i.e.*, double liners and leachate collection systems). SMA has urged the NRC to provide guidance that all EAF dust containing up to 50 pCi/g could be recycled by HTMR, and all EAF dust containing up to 100 pCi/g could be stabilized and disposed in hazardous waste landfills subject to RCRA's land disposal restrictions. The current alternative is to leave the dust in storage facilities behind steel plants.

DOE mixed waste facilities should accept contaminated EAF dust for treatment and disposal. DOE already has a program to properly dispose of radioactive ferrous scrap derived from government owned or licensed facilities. Until an adequate solution is found to remove radioactive material from the scrap metal stream and until regulations are implemented allowing radioactive EAF dust to be treated and disposed of at hazardous waste facilities, the NRC, EPA, and DOE should negotiate jointly a program under which DOE would accept radioactive EAF dust for treatment and disposal at DOE facilities.

The Steel Manufacturers Association urges the NRC-State Working Group to support our proposed remedies to solve a serious problem in our industry.



Table 1. Worldwide smeltings of radioactive sources.\*

No.	Year	Metal	Location	Isotope	GBq
1	— <sup>b</sup>	Au	unknown, NY	<sup>210</sup> Pb	unknown
2	83	Fe	Auburn Steel, NY	<sup>60</sup> Co	930
3	83	Fe	Mexico <sup>c</sup>	<sup>60</sup> Co	15,000
4	83	Au	unknown, NY	<sup>241</sup> Am	unknown
5	83	Fe	Taiwan <sup>d</sup>	<sup>60</sup> Co	0.37–1.74
6	84	Fe	U.S. Pipe & Foundry, AL	<sup>137</sup> Cs	0.37–1.9
7	85	Fe	Brazil <sup>e</sup>	<sup>60</sup> Co	unknown
8	85	Fe	TAMCO, CA	<sup>137</sup> Cs	56
9	87	Fe	Florida Steel, TN	<sup>137</sup> Cs	0.93
10	87	Al	United Tech, IN	<sup>226</sup> Ra	0.74
11	88	Pb	ALCO Pacific, CA	<sup>137</sup> Cs	0.74–0.93
12	88	Cu	Warrington, MO	Accel	unknown
13	88	Fe	Italy <sup>e</sup>	<sup>60</sup> Co	unknown
14	89	Fe	Bayou Steel, LA	<sup>137</sup> Cs	19
15	89	Fe	Cytemp Spec, PA	Th	unknown
16	89	Fe	Italy	<sup>137</sup> Cs	1,000 <sup>f</sup>
17	89	Al	Russia	unknown	unknown
18	90	Fe	NUCOR, UT	<sup>137</sup> Cs	unknown
19	90	Al	Italy	<sup>137</sup> Cs	unknown
20	90	Fe	Ireland	<sup>137</sup> Cs	unknown
21	91	Fe	India <sup>g</sup>	<sup>60</sup> Co	7.4–20
22	91	Al	Alcan Recycling, TN	Th	unknown
23	92	Fe	Newport Steel, KY	<sup>137</sup> Cs	12
24	92	Al	Reynolds, VA	<sup>226</sup> Ra	unknown
25	92	Fe	Border Steel, TX	<sup>137</sup> Cs	4.6–7.4
26	92	Fe	Keystone Wire, IL	<sup>137</sup> Cs	unknown
27	92	Cu	Estonia/Russia	<sup>60</sup> Co	unknown
28	93	Fe	Auburn Steel, NY	<sup>137</sup> Cs	37
29	93	Fe	Newport Steel, KY	<sup>137</sup> Cs	7.4
30	93	Fe	Chaparral Steel, TX	<sup>137</sup> Cs	unknown
31	93	Zn	Southern Zinc, GA	DU	unknown
32	93	Fe	Kazakhstan <sup>h</sup>	<sup>60</sup> Co	0.3
33	93	Fe	Florida Steel, TN	<sup>137</sup> Cs	unknown
34	94	Fe	Auburn Steel, NY IL	<sup>137</sup> Cs	0.074
35	94	Fe	U.S. Pipe & Foundry, CA	<sup>137</sup> Cs	unknown

## Notes

\* See Appendix for references.

<sup>b</sup> Multiple cases have been reported. The earliest occurred about 1910.<sup>c</sup> Contaminated product exported to U.S.<sup>d</sup> At least one contamination incident occurred in this time frame resulting in contaminated plumbing fittings exported to the U.S. There have been reports of contaminated structural steel used in buildings in Taipei, Taiwan, that were built in this time frame (Marley 1993).

source of radioactive contamination of gold was discovered in the U.S. in 1983 when gold contaminated with <sup>241</sup>Am was found. The origin of the <sup>241</sup>Am was never determined.

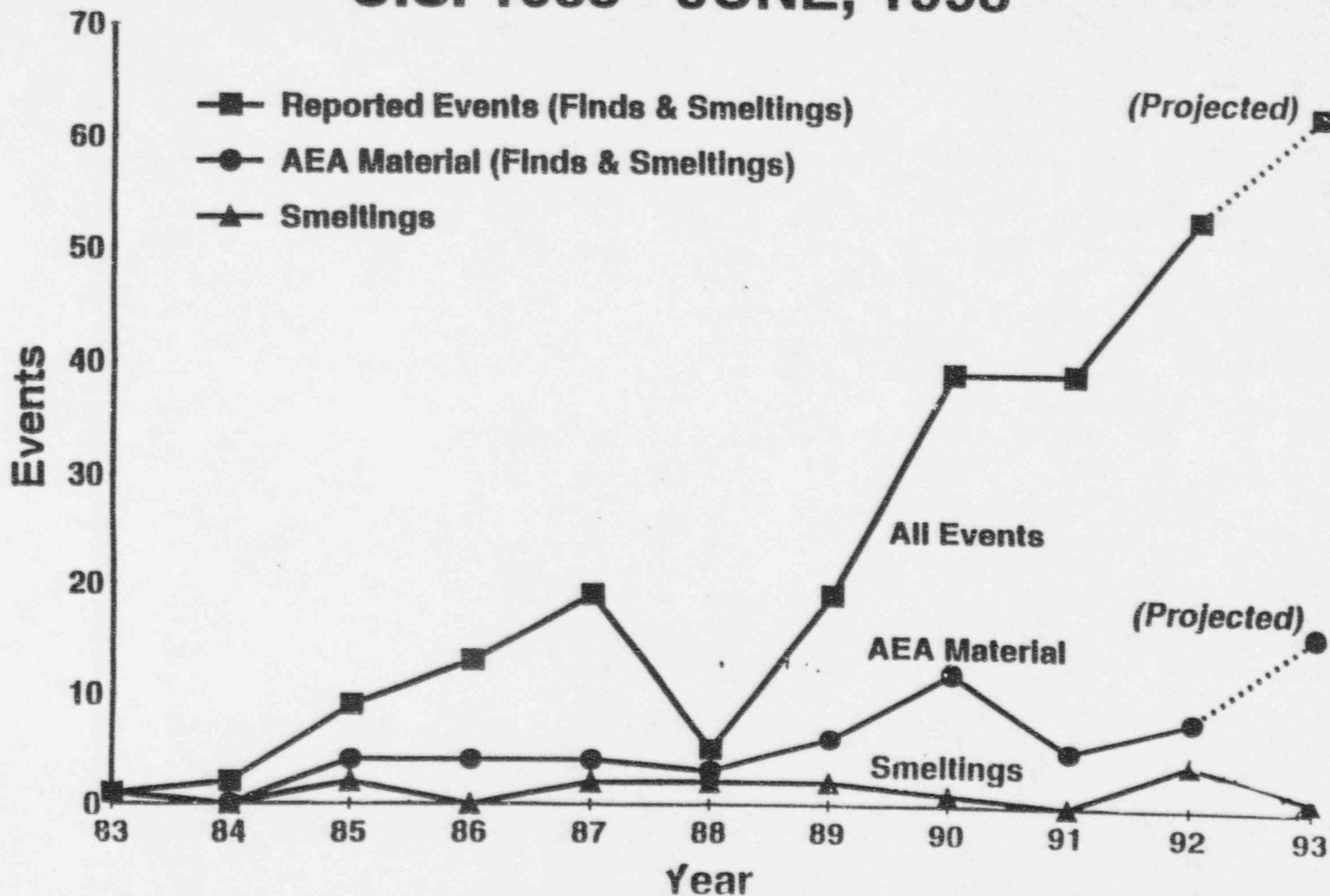
In 1983, a New York steel mill operated by Auburn Steel Company discovered that it had accidentally smelted about 930 GBq (25 Ci) of <sup>60</sup>Co (Bradley et al. 1986). An in-plant nuclear measuring gauge responded abnormally as the contaminated steel was processed and thus gave the initial indication to the mill workers that there was a problem. The plant had also become contaminated. Fortunately, all of the contaminated steel products were isolated at the plant and radiation exposures to the mill workers from the contaminated facility and products were minimal. Decontamination and radioactive waste disposal costs totaled \$4,400,000 (1983 costs).

A more serious contamination event involving <sup>60</sup>Co contamination of iron and steel products began unfolding in late 1983 when a <sup>60</sup>Co teletherapy unit was removed from storage in Ciudad Juarez, Mexico, disassembled and sold to a scrap yard (Marshall 1984; U.S. NRC

1985). As a result of the scrapping, the <sup>60</sup>Co source was breached resulting in the dispersion of 6,000 1 mm diameter × 1 mm long pellets, each containing about 2.6 GBq (70 mCi) of activity. Eventually, metal scrap contaminated by the <sup>60</sup>Co was transferred from the scrapyard to steel mills and iron foundries in Mexico, where they were smelted with the steel scrap, causing contamination of the plants and their products. Some of these products, reinforcing bars (rebar) and cast iron table pieces were exported to the U.S. All of the rebar in the U.S. estimated to be between 450 and 850 Mg (500 to 930 tons) was returned to Mexico except for a small amount imbedded at construction sites where exposures and resultant health effects were considered to be unlikely or insignificant. About 2,500 cast iron table pieces were found to be contaminated and these were returned to Mexico for disposal.

Worldwide, there are 35 reported cases where radioactive materials were accidentally smelted, as a result of the radioactive material being mixed with the metal scrap (Table 1; see Appendix for a list of references for the 35

# RADIOACTIVE MATERIAL IN METAL SCRAP U.S. 1983 - JUNE, 1993







REVIEW GROUP -  
RADIOACTIVE DEVICES

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

February 12, 1996

TO: Working Group (WG) Members

FROM: Joel Lubenau  
Co-chair *Joel Lubenau*

RE: Agreement State Public Workshop and 3rd meeting of the Working Group

By now you should have received copies of the transcript of our January 18-19, 1996 public workshop and the letter expressing our appreciation to our workshop panelists. The latter included as an attachment copies of public comments that have been received by NRC on the workshop. If you have not received these items, please let me know.

The workshop received considerable coverage by the trade press. Please see *Inside NRC*, February 5, 1996 and *American Metal Market*, January 23, 1996.

The Office of State Programs has announced that a public workshop for Agreement States representatives will be held in Vancouver, Washington on March 5 & 6, 1996 (attachment 1). The workshop will include a briefing of the Agreement State representatives on the WG activities and will provide an opportunity for Agreement State input on some of the technical issues that are facing us. A draft agenda for this part of the meeting is attached (attachment 2). Following this workshop, a public meeting of our WG will be held at the same location on March 7, 1996. A draft agenda for this meeting is attached (attachment 3). As usual, our meeting will be announced in the NRC Public Meeting Announcement System and copies of the meeting announcement and draft agenda will be mailed to all persons on our mailing list. State members of the WG should coordinate your travel plans for these meetings with Brenda Usilton, OSP, 301-415-2348.

A new item has been brought to our attention by Bruce Sanza, Illinois (attachment 4). We plan to include a discussion of this issue during the March 7 meeting.

As you remember, a field trip to a steel mill and scrap processing plant that had been planned in conjunction with our December, 1996 meeting was cancelled because of a combination of bad weather and time constraints. Martha Dibblee has offered to arrange for visits to a steel mill and scrap processing plant in the Portland, Oregon vicinity on March 8, 1996 (again, weather and time constraints permitting). If you plan to participate in this field trip, please advise both Martha and Brenda.

9602140064 spo

Bob Free and I had originally planned to consult with each of you individually by telephone this month to obtain your views on the next steps of our regulatory review. However, because of the need to develop plans for our participation in the Agreement State meeting, we have had to delay this. As an alternative, we would like to consult with each of you individually during our time in Vancouver. Please be prepared to give your views on the results of our public meetings, the public workshop, and public comments and your recommendations of what direction we should go to carry out our charter.

Bob and I look forward to seeing you in Vancouver, Washington.

Attachments: As stated

cc w/attachments:

- WG liaisons
- R. Virgilio, OSP
- NRC PDR
- R. Paris, OR
- T. Strong, WA

cc w/o attachments:

- B. Usilton, OSP

U.S. NUCLEAR REGULATORY COMMISSION

Notice of Organization of Agreement States Technical Workshop

AGENCY: U.S. Nuclear Regulatory Commission

ACTION: Notice of Meeting

SUMMARY: The U.S. Nuclear Regulatory Commission (NRC) staff plans to hold a public meeting for technical representatives of the Organization of Agreement States (OAS). Agreement States are States which have assumed regulatory authority over certain radioactive materials. The purpose of the meeting is to discuss Agreement State Program issues with Agreement State technical representatives. Current topics for discussion include a Status Report on NRC Program Activities, i.e., NRC/EPA Interface Issues, Implementation Procedures for Compatibility Policy and Decommissioning Rule; and individual break out sessions on NRC's review of the National Academy of Sciences Report/Medical Program Area; Industrial Radiography; and Radioactive Devices. In an attempt to better accommodate the number of attendees for this workshop, advanced registration is required by February 14, 1996.

DATE: The meeting will be held from 8:30 a.m. til 5:00 p.m on March 5, 1996, and from 8:30 a.m. til 4:00 p.m. on March 6, 1996.

ADDRESS: The meeting will be held at the Red Lion Inn at the Quay, 100 Columbia Street, Vancouver, Washington, 360/694-8341. Vancouver is located directly across the Columbia River from Portland, Oregon, and is served by the Portland airport.

FOR REGISTRATION INFORMATION CONTACT: Brenda Usilton, Office of State Programs, Mail Stop OWFN-3-D-23, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Telephone 301/415-2348.

FOR FURTHER INFORMATION CONTACT: Rosetta Virgilio or Stephen Salomon, Office of State Programs, Mail Stop OWFN-3-D-23, U.S. Nuclear Regulatory Commission, Washington, D.C. at 301/415-2307 and 301/415-2368, respectively.

CONDUCT OF THE MEETING: The meeting will be conducted in a manner that will expedite the orderly conduct of business. A transcript of the second day of the meeting will be available for inspection, and copying for a fee, at the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington, D.C. 20555, on or about May 5, 1996.

The following procedures apply to public attendance at the meeting:

1. Questions or statements will be entertained as time permits on a first-come, first-served basis, following breakout session discussion and summary.
  2. Seating will be on a first-come, first-served basis.
- Dated at Rockville, Maryland, this 2nd day of February, 1996.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Richard L. Bangart, Director  
Office of State Programs

*Handwritten:* 1

D - R - A - F - T

Agenda for Breakout Session on Regulation of Radioactive Devices

Tuesday, March 5, 1996

9:45 - 10:00 am Call to Order

Bob Free

10:00 - 11:15 am Introduction

The Problem  
NRC & Agreement State Actions to Date  
The Working Group  
Public Workshop Results

Joel Lubenau

11:15 - 11:45 am The Challenge - Technical Issues

What sources and devices are of concern?  
What can be done to improve/enhance the  
identification of devices?  
What are the regulatory aspects of  
design changes?  
What are the regulatory impediments to  
reporting and disposing of "found"  
sources & devices?

Bob Free

1:00 - 3:00 pm Sources and Devices of regulatory concern

Bob Free & Joel Lubenau

3:00 - 3:30 pm Identifying devices

Bob Free & Joel Lubenau

3:30 - 4:15 pm Design changes

Bob Free & Joel Lubenau

4:15 - 5:00 pm Disposal impediments

Bob Free & Joel Lubenau

D - R - A - F - T

Agenda for 3rd meeting of the Working Group

March 7, 1996

8:00 - 8:30 am	Call to Order
	Co-chairs
8:30 - 10:30 am	Options for funding increased regulatory oversight of radioactive devices
	Working Group
10:30 - 12 noon	Insurance options for metal making and recycling industries
	Insurance company representative
	Working Group
Lunch	
1:00 - 2:00 pm	Removing disincentives for proper disposal of licensed devices
	Compact representative
	Working Group
2:00 - 3:00 pm	Gauges Using Exempt Sources
	Working Group
3:00 - 4:00 pm	Review of Working Group Charter Tasks
	Working group
4:00 - 5:00 pm	Workplan for Working Group Report
	Co-Chairs

Note: Opportunities will be available during each session for public comment.

2/8/96

Note to Bob Free

Bruce Sanza, IL brought this to my attention. Perhaps we should add this to the WG meeting agenda. It concerns NRC permitting a gauge manufacturer to distribute gauges sans a radioactive source and instructing the customer to purchase up to 10 exempt quantities of radioactive material and insert them into the device. According to our legal counsel, this is not prohibited under present regulations. Having these types of devices out there is going to confound the efforts of steel mills and scrap processors to detect improperly disposed sources. The WG may wish to review this and make recommendations to the Commission.

  
Joel

~~9602140072~~ ip

Attachment 4



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

MAR 17 1995

Richard Ratliff, Chief  
Bureau of Radiation Control  
Texas Department of Health  
1100 W 49th Street  
Austin, TX 78756-3189

Dear Mr. Ratliff:

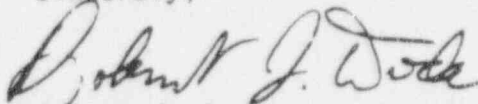
This is in reply to the questions you raised in your letter to me of February 15, 1995, concerning a device manufactured by Ronan Engineering Company, Florence, Kentucky.

You included a NRC letter (R. L. Baer to Ronan Engineering Company, dated June 3, 1994), which described an acceptable procedure for the use of radioactive sources under 10 CFR 30.18 of NRC's regulations. This letter had received prior NRC legal review and the procedure described is not in violation of any NRC regulations. I have enclosed a copy of this letter, for your convenience, as Enclosure 1. A second letter (R. L. Baer to Ronan Engineering, dated March 2, 1995) is enclosed as Enclosure 2, which further explains the case where a specific licensee of NRC or an Agreement State receives exempt quantities of radioactive material pursuant to 10 CFR 30.18 or an equivalent Agreement State regulation.

You pointed out in your letter that one of the conditions of licensure, 10 CFR 32.19(d), states that "Exempt Quantities Should Not Be Combined." In the Ronan case described, it is our understanding that exempt quantities of radioactive material are not being combined and the radioactive material remains in the exempt form of 10 discrete radioactive sources.

In conclusion, the procedure described is acceptable pursuant to current NRC regulations and the user of such a device would be exempt from NRC regulations. However, as Mr. Baer pointed out in the enclosed March 2, 1995, letter, specific licensees are not relieved of any responsibilities under their license and, with regard to radiation safety and protection standards, must consider all sources of radiation present when determining Occupational Dose (as defined in 10 CFR 20.1003 Occupational Dose).

Sincerely,



Robert J. Doda  
State Agreements Officer

Enclosures:  
As Stated

9602140074

Richard Ratliff

-2-

bcc w/enclosures:

LCallan

SCollins

CHackney

WBrown

Texas File

PLohaus, SP

RBaer, NMSS

DOCUMENT NAME: P:\doda\40.bjd

To receive copy of document, indicate in box: "C" = Copy without enclosures "E" = Copy with enclosures "N" = No copy

RIV:SPO	<input checked="" type="checkbox"/>	RC	1/15/95	DRA	RA			
RJDoda/cjd	<input checked="" type="checkbox"/>	WLBrown		JMMontgomery	LJCallan			
3/15/95		3/16/95		3/16/95	3/16/95		1/95	

OFFICIAL RECORD COPY



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

JUN 03 1994

Ronan Engineering Company  
Measurements Division  
ATTN: Bon Cahill  
General Manager  
8050 Production Drive  
Florence, KY 41042

Dear Mr. Cahill:

This letter is in response to your facsimile dated May 7, 1994, in which you asked for verification that the advice you plan to give to your customer will not put you, your customer, or the persons supplying sources under an NRC license issued pursuant to 10 CFR 32.18 in violation of NRC regulations.

Specifically, you plan to advise your customer to purchase 10 sources each having a quantity of byproduct material which does not exceed the applicable quantity set forth in 10 CFR 30.71, Schedule B, from a person specifically licensed by NRC pursuant to 10 CFR 32.18 and place them into a protective stainless steel tube, designed by Ronan. The customer is then advised to insert the tube into a mold housing opposite a radiation detector. You are advising your customer that he is exempt, pursuant to 10 CFR 30.18, from the requirements for a license to use the sources in this configuration.

The situation described in your facsimile does not violate any NRC regulations as long as your customer is not specifically licensed by NRC or an Agreement State and your customer receives the sources directly from the person licensed pursuant to 10 CFR 32.18.

If you have any additional questions, please contact me at (301) 415-8125 or Mr. John Lubinski of my staff at (301) 415-7868.

Sincerely,

*Robert L. Baer*  
Robert L. Baer, Branch Chief  
Source Containment and  
Devices Branch  
Division of Industrial and  
Medical Nuclear Safety

cc: Vicki Jeffs  
Radiation Control Branch  
Cabinet of Human Resources

ENCLOSURE 1

9412220140 10

Mar 14 '95  
March 2, 1995

9:47 No.001 P.06

Ronan Engineering Company  
Measurements Division  
ATTN: Mr. Thomas Niinemets  
Assistant General Manager  
8050 Production Drive  
Florence, KY 41042

Dear Mr. Niinemets:

This letter is in response to your facsimile dated February 16, 1995, in which you requested clarification of the next to last paragraph of my letter of June 3, 1994, to Mr. Cahill, General Manager of Ronan Engineering Company (see attached).

The intent of that paragraph was to point out that members of the public and general licensees could receive exempt quantities of material directly from the person licensed pursuant to 10 CFR 32.18 without being obligated to meet other NRC regulations. However, as we previously discussed on the telephone, this does not apply to persons or organizations who are specifically licensed by the NRC or an Agreement State. Specific licensees are not relieved of any responsibilities under their license and, with regard to Radiation Safety and Protection Standards, must consider all sources of radiation present when determining Occupational Dose (as defined in 10 CFR 20.1003 Occupational Dose). Exempt quantity materials should be handled the same as licensed materials.

I hope this clarifies the situation.

Sincerely,

Original Signed by

Robert L. Baer, Branch Chief  
Source Containment and  
Devices Branch  
Division of Industrial and  
Medical Nuclear Safety

cc: Vicki Jeffs  
Radiation Control Branch  
Cabinet of Human Resources

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OFC:	SCDB	IMAB	OGC	
NAME:	RBaer/tk <i>2/23</i>	JPiccone	RPiccone <i>2/23</i>	
DATE:	02/28/95	02/ /95	02/2/95	

G: RONAN.RLB

ENCLOSURE 2

9602140079 1P



# Texas Department of Health

David R. Smith, M.D.  
Commissioner

1100 West 49th Street  
Austin, Texas 78756-3189  
(512) 458-7111

Radiation Control  
(512) 834-6688

Carol S. Daniels  
Deputy Commissioner for Programs

Roy L. Hogan  
Deputy Commissioner for Administration

February 15, 1995

Mr. Robert J. Doda  
State Agreements Program  
United States Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, Texas 76011

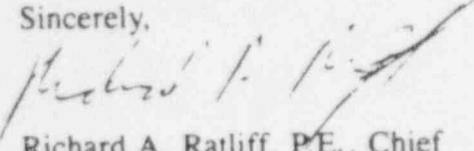
Dear Mr. Doda:

Recently, one of my staff was contacted by the Radiation Safety Officer (RSO) of a licensee who had just discovered that a new density gauge was being planned for his facility without his knowledge. When the RSO confronted the engineer in charge, he was told that the gauge did not come under the jurisdiction of the United States Nuclear Regulatory Commission (NRC) or the State of Texas because he was using exempt quantities of Cs-137. The company supplying the device (Ronan Engineering Company - Florence, Kentucky) had indicated to the engineer that they could acquire ten 9  $\mu$ Ci Cs-137 sources and place them into the device without coming under the jurisdiction of either Texas or the NRC. As documentation for such an authority, the Ronan representative provided the engineer with a letter from the NRC that seems to allow the use of several exempt quantities in a single device (copy NRC Letter dated June 3, 1995 enclosed).

We take exception to this letter because it implies that several individual sources containing exempt quantities can be combined and placed into a device with no regulatory control. Please note that the combination of these sources would cause them to be used as a single quantity of radioactive material in excess of the exempt quantity, contrary to the limitations of 10 CFR 30.18. In addition, the rule describing the conditions of licensure [10 CFR 32.19(d)] for distribution of exempt quantities requires the distributor to place on the label or a brochure accompanying the exempt source, the words, "Exempt Quantities Should Not be Combined." This would indicate that the intent of the rule was not to allow the use of multiple quantities of exempt sources in the same device or application.

We would appreciate you looking into this problem and providing resolution of our conflicting views.

Sincerely,

  
Richard A. Ratliff, P.E., Chief  
Bureau of Radiation Control

Enclosure